AN OSTEOPHThic APPROACH TO FOOT PAIN

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No conflicts of interest

But we have a lot to cover in a very short period of time, so I may skip over things you consider important. But,...
OUTLINE

• What I am not covering
• CASE PRESENTATION
• FOOT ANATOMY AND PHYSIOLOGY
• COMMON FOOT PROBLEMS
• GAIT CYCLE
• KINETIC CHAIN
• OSTEOPATHIC INTEGRATION
What I am not discussing (too much)

- **Orthotics** – we don’t make them and PT and Podiatry does more – so let them address it

- **Arch Supports** – if they NEED them. But, strengthening the foot should still be part of this – also a PT issue

- **Best running shoes:**
  - no one really knows. The shoe makers “scientific” shoes are more about the science behind the material...not so much about good mechanics
  - Running stores: they get trained by shoe industry; evaluating walking gait is not the same as the running gait.
Foot anatomy: the breakdown – ankle/hindfoot/midfoot/forefoot
Common Foot Problems

• Anatomical abnormality or Traumatic with instability → Orthopedic issue
• Trauma without much instability → ankle sprains, Ortho and PT
• “OVERUSE” INJURIES....look for the biomechanical reason for “overuse”
  • Plantar fascia pain
  • TIBIALIS POSTERIOR DYSFUNCTION!!!
  • Achilles Tendon pain
  • FOOT PAIN – “it just hurts”
• I do believe “itis” is WAY OVER emphasized. It can exist but usually it is rapid onset in nature but sometimes there still is a biomechanical origin...
• SEVERE DISEASE!!! – KIDS ARE NOT YOUNG ADULTS
CASE PRESENTION

• 26 YO marathoner presents with 2 days of right ankle pain, after a 10 mile run
• Limps into clinic exam room due to pain
• Tenderness, weakness and swelling along the right posterior tibialis muscle – **Acute Tibialis Posterior Tendonitis**
• OMT to up-slipped right hip and to lumbar, sacrum, foot
• Walks out with near normal gait “but it still hurts…”
• Pain-free running 2 days later
Muybridge Images: photographer who developed rapid-film that allowed “gait” evaluation
Gait: term used to describe the “neural strategy” used for motion and maintaining balance. (per discussion with OU-HCOM Comparative Anatomist James O’Reily, PhD)
What is the fundamental flaw in these two pictures?
Kinetic Chain

• **Kinetic Chain Model**: A synergistic, neurally-directed recruitment of muscles groups in a proximal-to-distal pattern to create maximally effective movement;
  • **Requires proximal stability for distal mobility**

Kinetic Chain
3....Is a magic number......
The Foot Core System: a “new” paradigm for understanding foot muscle function (3!!)


- Directly Based upon Panjabi and his publication of the spine stabilization model
  - This publication is often cited in rehabilitation articles about “The Core”.
The Foot Core System: a “new” paradigm for understanding foot muscle function (3!!)


Osteopathic Paradigm: what is a “somatic dysfunction”? 

Arthroidial

NEURAL COMPONENT (vasc; lymph)

Fascia → Muscle

Active Subsystem
Intrinsic Foot Muscles (local stabilizers)
Extrinsic Foot Muscles (global movers)

Passive Subsystem
Bones of the arches (foot half dome)
Plantar fascia
Ligaments

Foot Core System

Neural Subsystem
Musculotendinous receptors – local and global
Ligamentous receptors (including plantar fascia)
Plantar cutaneous receptors
Foot Anatomy

3 Parts of Foot:
1) **Hind Foot**: calcaneus and talus
2) **Mid-Foot**: tarsals
3) **Fore-Foot**: meta-tarsals and phalanges

Muscles:
1) *Calf and Anterior Tibilais*: impact **Hindfoot** (dorsi and plantar fexion)
2) *Tibialis Posterior*: impacts **midfoot medially** (inversion)
3) *Peroneous(fibularis)*: impacts **midfoot medially** *(longus)* and **laterally** *(brevis)* (eversion)
3 Arches of the Foot:

**Medial Arch**: Talus, navicular/cuneiforms, 1-3 digits

**Lateral Arch**: Calcaneus, cuboid, 4-5 digits

**Transverse Arch**: Navicular, cuneiforms, cuboid

3 parts of feet: hind, mid, fore foot

3 functional muscle regions:
  - posterior/anterior;
  - medial/lateral;
  - Plantar Aponeurosis/intrinsic foot muscles

3 Arches: overlapping muscles and bones
Passive and Active Support System
The Foot Core System: a “new” paradigm for understanding foot muscle function


Osteopathic Paradigm: what is a “somatic dysfunction”?
Case Presentation

• 16 yo male competitive Taekwondo with 1.5 years of right foot pain
• No pain during lifting or football
• Pain only during roundhouse kicks
• 2 rounds of physical therapy focused on right foot strengthen did not help
• Resting from Taekwondo did not help
Roundhouse Kick – notice foot on ground!!
Kinetic Chain – deriving issues beyond the area of complaint.
Case #2 – 16 yo with right foot pain

• His left hip had significant deficits in internal and external rotation
• I did a little OMT but...sent him home with aggressive hip stretching
• 3 weeks later – full contact participation without pain

• There was no assessment of his KINETIC CHAIN by physical therapy – 2 rounds!
My Father – masters discus thrower who had a torn TIBIALIS POSTERIOR muscle.

“I have had a lot of sports injuries and have had to go to physical therapy, probably the past 10 years, about a year and half worth of time. I don’t ever remember a physical therapist actually putting hands on me. I remember them giving me exercises but that’s it.”
The goal of OMT is to improve mobility of joints/muscles/fascia to allow the nervous system to recruit correctly: synergistically from proximal to distal.

To Do:
1) Assess the critical areas along the kinetic chain of the LE
2) Get some movement in as many areas as you can
3) Leave it alone

• Don’t:
  1) think you have to get maximal motion in EVERY joint at one visit
  2) worry too much about the precise “soft tissue” problems. Rehab of plantar fascial pain and Achilles tendonitis and similar.

(I have seen plenty of patients with “precise” diagnoses and orthotics who are not better)
Osteopathic Approach – treat the whole person!!
Foot and Ankle manipulation in the Elderly


• 17 elderly adults (74 yo) stood barefoot, feet together/eyes open and sway as little as possible, on a force plate – “CONTROL”

• Then told to close eyes for a 10-second evaluation of balance

• Tested before and after foot manipulation

• Massage Therapists were to “target the somatosensory system of the feet and ankle, using manual massage of the feet and mobilization of both the feet and ankle.”

• RESULT: Eye-closed balance was improved AFTER the manipulation compared to BEFORE the manipulation
Osteopathic Approach

• **Treat proximal before distal**: lumbo-sacral-pelvic-hip
  • Iliopsoas and Piriformis tender point treatment; SI joint mobility
• **Knee**: Internal vs external rotation
• **Fibular Head**: anterior vs posterior glide
• **Ankle/Foot complex**:
  • Tenderpoints:
    • Gastrocnemius/soleus and Anterior Tibialis: IMPACT → Hind foot and both archs
    • Posterior Tibialis: IMPACT → mid foot, medial arch, transverse arch
    • Peroneous muscles: IMPACT → mid foot, lateral arch, transverse arch
    • Plantar aponeurosis/small muscles: IMPACT → plantar aspect
  • Mobilization of Hind foot/mid foot/forefoot
# Knee

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- **Mobilization of Hind foot/mid foot/forefoot**
Osteopathic Approach

• Joint mobilization of the ankle/foot
  • *Dorsiflexion vs plantar flexion*: ME or joint mobilization
  • *Hindfoot*: grasp heel and anterior talus
  • *Medial Arch*: tender navicular/cuneiform: counterstrain, large arch mobility
  • *Lateral arch*: cuboid mobility, large arch mobility

Talus

• Locate the medial and lateral malleoli
• Now, move medially and anteriorly to the midline of the foot.
• Palpate the rounded prominence. This is the head of the talus
• Input rotary motion between the talus and calcaneus and compare motion bilaterally
Navicular & Cuboid

- Navicular is located just inferior and distal to the medial portion of the head of the talus.
- Invert and evert the foot to assure contact with the navicular, in inversion the navicular tubercle will become more prominent.

- Cuboid is located just proximal to the 5th metatarsal and articulates with the calcaneus.
- Locate the tuberosity of the 5th metatarsal and move your contact proximally until a drop off is felt.

- Note the articulation between the cuboid and navicular.
Cuneiforms & Metatarsals

- Begin palpation just proximal to the metatarsal phalangeal joint.
- Explore all 5 metatarsal bones
- The 5th metatarsal bone has a lateral prominence named the tuberosity of the 5th metatarsal
- Locate the 1st metatarsal and move proximally to palpate a small joint between the medial cuneiform and the 1st metatarsal
- Move onto the cuneiform and examine the bony structures more laterally (middle and lateral cuneiforms)
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Question?